

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): A pallet changer, for changing pallets, provided on a machine tool being a five-axis controlling machine tool, said machine tool comprising:

a spindle head being movable in three mutually transverse axes directions relative to a workpiece supported by a pallet mounted on a table; and

said table disposed below a level of said spindle head, said table is driven by a table drive unit so that said table is swingable and positioned while ~~directing upwardly~~ being directed in an upward direction and also making at least an index motion, wherein said table as driven by said table drive unit is also capable of making rotational motion as well as the index motion,

said pallet changer comprising:

a pallet setup base, provided outside a machining area of said machine tool, for placing the pallet on said pallet setup base; and

a pallet change arm, which is provided with at least one pallet grip portion for gripping and releasing the pallet, for making a swivel motion substantially in a horizontal plane and for moving up and down,

wherein said pallet change arm makes the swivel motion and moves up and down so that the pallet is transferred between said table and said pallet setup base and is received and discharged to said table and said pallet setup base, respectively.

Claim 2 (Currently Amended): The pallet changer for the machine tool according to claim 1, wherein a supporting shaft for supporting said pallet change arm is disposed in the vicinity of the machining area ~~[[and]]~~ while remaining outside the machining area, and a standby position of said pallet change arm is outside the machining area and in remaining the vicinity of the machining area and is a lifted position of said pallet change arm.

Claim 3 (Currently Amended): The pallet changer for the machine tool according to claim 2, said pallet changer comprising: an ~~[[APC]]~~ automatic pallet changer body mounted on a bed; and an ascending and descending portion, supported by said ~~[[APC]]~~ automatic pallet changer body, for ascending and descending and for supporting said supporting shaft to be rotatable in a forward direction and a reverse direction, wherein a swivel servomotor for drivingly rotating said supporting shaft is mounted on said ascending and descending portion, and said pallet change arm is swiveled and positioned at a predetermined position when the swivel servomotor is turned on and off, ~~said pallet change arm is swiveled and positioned at a predetermined position~~, and said pallet change arm is swiveled in a clockwise direction and in a counterclockwise direction substantially in the horizontal plane in plan view, respectively.

Claim 4 (Currently Amended): The pallet changer for the machine tool according to claim 2, wherein said pallet change arm is positioned in a standby position for being ready without a pallet changing operation[[,]] in which the pallet change arm is in a first pallet grip position[[,]] or in a second pallet grip position in which the second pallet grip position opposite the first pallet grip position opposite by 180 degrees ~~to the first pallet grip position, and in another predetermined position, respectively.~~

Claim 5 (Original): The pallet changer for the machine tool according to claim 1, wherein the pallet grip portions are provided on both end portions or in the vicinity of the both end portions of said pallet change arm, respectively.

Claim 6 (Currently Amended): A machine tool provided with a pallet changer, said machine tool being a five-axis controlling machine tool comprising:

a spindle head being movable in three mutually transverse axes directions relative to a workpiece supported by a pallet mounted on a table; and

said table disposed below a level of said spindle head, said table is driven by a table drive unit so that said table is swingable and positioned while ~~directing upwardly~~ being directed in an upward direction and also making at least an index motion, wherein said table as driven by said table drive unit is also capable of making rotational motion as well as the index motion,

said pallet changer comprising:

a pallet setup base, provided outside a machining area of said machine tool, for placing the pallet on said pallet setup base; and

a pallet change arm, which is provided with at least one pallet grip portion for gripping and releasing the pallet, for making a swivel motion substantially in a horizontal plane and for moving up and down,

wherein said pallet change arm makes the swivel motion and moves up and down so that the pallet is transferred between said table and said pallet setup base and is received and discharged to said table and said pallet setup base, respectively.

Claim 7 (Original): The machine tool according to claim 6, wherein said machine tool is a five-axis controlling vertical machining center in which an axis of a main spindle supported rotatably by said spindle head is directed substantially in the vertical direction to a floor surface so that said table makes a rotational motion in addition to the index motion.

Claim 8 (Original): The machine tool according to claim 6, wherein said table drive unit comprises: a swing drive unit for swinging said table; and an index drive unit for indexing the pallet and for rotating the pallet relative to said table, wherein said swing drive unit for supporting said table to be swingable at both ends is disposed in front of said machine tool, and said index drive unit

is provided on said table, and said swing drive unit is driven so that said table and said index drive unit are swung and indexed at a predetermined position.

Claim 9 (Currently Amended): The machine tool according to claim 8, wherein said machine tool ~~performs a cutting by~~ cuts a workpiece by using a rotating tool and ~~performs a turning by~~ turns a workpiece by using a turning tool ~~to the workpiece.~~

Claim 10 (New): A pallet changer, for changing pallets, provided on a machine tool being a five-axis controlling machine tool, said machine tool comprising:

a spindle head being movable in three mutually transverse axes directions relative to a workpiece supported by a pallet mounted on a table; and

said table disposed below a level of said spindle head, said table is driven by a table drive unit so that said table is swingable and positioned while being directed in an upward direction and also making at least an index motion,

said pallet changer comprising:

a pallet setup base, provided outside a machining area of said machine tool, for placing the pallet on said pallet setup base; and

a pallet change arm, which is provided with at least one pallet grip portion for gripping and releasing the pallet, for making a swivel motion substantially in a horizontal plane and for moving up and down,

wherein said pallet change arm makes the swivel motion and moves up and down so that the pallet is transferred between said table and said pallet setup base and is received and discharged to said table and said pallet setup base, respectively, and

wherein said pallet change arm which is moved up and down ascends up to a predetermined lifted position, while said pallet change arm makes the swivel motion and is under a standby condition, so that said pallet change arm does not interfere with other structural components of said machine tool.

Claim 11 (New): A machine tool provided with a pallet changer, said machine tool being a five-axis controlling machine tool comprising:

a spindle head being movable in three mutually transverse axes directions relative to a workpiece supported by a pallet mounted on a table; and

said table disposed below a level of said spindle head, said table is driven by a table drive unit so that said table is swingable and positioned while being directed in an upward direction and also making at least an index motion,

said pallet changer comprising:

a pallet setup base, provided outside a machining area of said machine tool, for placing the pallet on said pallet setup base; and

a pallet change arm, which is provided with at least one pallet grip portion for gripping and

releasing the pallet, for making a swivel motion substantially in a horizontal plane and for moving up and down,

wherein said pallet change arm makes the swivel motion and moves up and down so that the pallet is transferred between said table and said pallet setup base and is received and discharged to said table and said pallet setup base, respectively, and

wherein said pallet change arm which is moved up and down ascends up to a predetermined lifted position, while said pallet change arm makes the swivel motion and is under a standby condition, so that said pallet change arm does not interfere with other structural components of said machine tool.